What is Claimed Is:

1. A stator comprising groups of electromagnetic poles, each of the groups comprising magnetic material magnetically isolated and separated from the other groups, the magnetic material comprising a soft magnetic composite of compacted individual particles of an iron alloy, each particle coated with a dielectric material such that the particles are electrically isolated from each other.

2. A rotary electric motor comprising:

a stator configured in the form an annular ring of groups of electromagnetic poles in accordance with claim 1, the groups substantially equidistantly distributed along the angular extent of the annular ring; and

an annular rotor, concentric with an access of rotation and concentric with the annular stator to form a radial air gap therebetween, comprising a plurality of permanent magnet poles, substantially equidistantly distributed with alternating magnetic polarity along the angular extent of the air gap, the permanent magnetic poles having a common magnetic return path.

3. The rotary electric motor according to claim 2, wherein each group of electromagnetic poles comprises windings that are switchably energized for driving electromotive interaction between the stator and rotor.

4. The stator according to claim 1, wherein the iron alloy comprises at least one element selected from the group consisting of silicon (Si), cobalt (Co), nickel (Ni), phosphorous (P), titanium (Ti), vanadium (V), zirconium, (Zr), and aluminum (Al).

5. The stator according to claim 4, wherein the iron alloy contains 0.0-3 at.% Si and/or 10 to 50 at.% Co.

6. A method of manufacturing a stator comprising groups of electromagnetic poles, each of the groups comprising magnetic material isolated and separated from each other, the method comprising forming the magnetic material of a soft magnetic composite by:

atomizing an iron alloy to form a plurality of particles;

coating each particle with a dielectric material;

forming a mixture of the coated iron alloy particles and a lubricant;

compacting the mixture at an elevated temperature and pressure to form a green compact; and

heat treating the green compact to form the soft magnetic composite.

7. The method according to claim 6, wherein the iron alloy comprises at least one element elected from the group consisting of silicon (Si), cobalt (Co), nickel (Ni), potassium (P), titanium (Ti), vanadium (V), zirconium (Zr), and aluminum (Al).

8. The method according to claim 6, comprising adding a binder to the mixture prior to compacting.

9. The method according to claim 6, comprising forming the soft magnetic composite at a density of at least 98% of the theoretical density for the iron alloy.

10. A method of manufacturing a component of an electric motor, the component comprising a soft magnetic composite having a targeted shape, targeted dimensions and targeted magnetic, electrical and mechanical properties, the method comprising:

determining a magnetic iron alloy composition and process conditions designed to achieve the targeted properties;

forming particles of a predetermined iron alloy composition;

coating each particle with a dielectric material;

mixing the coated iron alloy particles with a lubricant to form a mixture;

compacting the mixture at the predetermined process conditions of temperature, pressure, time and atmosphere to form a green compact; and

heating the green compact at the predetermined conditions of temperature, time and atmosphere to form the soft magnetic composite component comprising the individual iron alloy particles electrically isolated from each other by the dielectric material, the soft magnetic composite component having the targeted shape, dimensions and properties.

11. The method according to claim 10, comprising combining the coated iron alloy particles with a lubricant and a binder to form the mixture.

12. The method of manufacturing a stator comprising a plurality of groups of electromagnetic poles, the method comprising manufacturing the groups of electromagnetic poles from the soft magnetic composite material according to claim 10.

13. A method of manufacturing a rotary electric motor comprising a stator configured in the form of an annular ring of groups of electromagnetic poles, the groups substantially equidistantly distributed along the angular extent of the annular ring, each of the groups comprising magnetic material magnetically isolated and separated from the other groups; and

an annular rotor, concentric with an axis of rotation and concentric with the annular stator to form a radial air gap therebetween, comprising a plurality of permanent magnetic poles substantially equidistantly distributed with alternating magnetic plurality along the angular extent of the air gap, the permanent magnetic poles having a common magnetic return path, the method comprising manufacturing the groups of electromagnetic poles from a soft magnetic composite material formed in accordance with claim 10.

14. A method of manufacturing a rotary electric motor according to claim 13, wherein each group of electromagnetic poles comprises windings that are switchably energized for driving electromotive interaction between the stator and rotor.

15. The method according to claim 10, wherein the iron particles include at least one element selected from the group consisting of silicon (Si), cobalt (Co), nickel (Ni), potassium (P), titanium (Ti), vanadium (V), zirconium (Zr), and aluminum (Al).

16. The method according to claim 10, further comprising:

determining the amount of shrinkage which the green compact undergoes during post compaction heating as a function of the nature and amount of an alloying element of the iron alloy; and

compacting the mixture to a predetermined size such that, upon subsequent heating, the green compact shrinks to achieve the targeted shape and targeted dimensions.

17. A soft magnetic composite produced in accordance with the method according to claim 10.

18. A part comprising at least two different soft magnetic composites, each soft magnetic composite comprising compacted individual particles of an iron alloy, each particle coated with a dielectric material such that the particles are electrically isolated from each other.

19. The part according to claim 18, comprising 3 different soft magnetic composites.

20. The part according to claim 18, wherein each soft magnetic composite comprises a different iron alloy.

21. The part according to claim 18,wherein each soft magnetic composite comprises the same iron alloy.